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Robertson
appellant
Brief
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of: Satoshi NAKAMURA

Application No.: 09/818,686

Filed: March 28, 2001

For: PRINTED WIRING BOARD HAVING
HEAT RADIATING MEANS AND
METHOD OF MANUFACTURING THE
SAME

) Confirmation No.: 2438
)
) Group Art Unit: 2835
)
) Examiner: Boris L. Chervinsky
)
) **MAIL STOP APPEAL BRIEF-**
) **PATENTS**
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APPELLANT'S BRIEF UNDER 37 C.F.R. § 1.192

This brief is in furtherance of the Notice of Appeal, filed in the above-identified patent application on May 15, 2003, and appealing the final rejections of claims 1, 6, 7, 10-13 and 15-22 by the United States Patent and Trademark Office in a Final Office Action dated January 15, 2003. A fee of \$320.00 required under 37 C.F.R. § 1.17(c) is being filed concurrently herewith. The period for filing this brief extends through July 15, 2003. This brief is being transmitted in triplicate.

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1. The Real Party in Interest

The real party in interest in this appeal is ROHM CO., LTD, Japan.

2. Related Appeals and Interferences

Appellant is not aware of any other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

3. Status of Claims in Application

The status of the claims is as follows upon filing of this Appeal Brief:

Claims canceled: 2-5, 8, 9 and 14

Claims withdrawn from consideration but not canceled: None

Claims pending: 1, 6, 7, 10-13 and 15-22

Claims allowed: None

Claims rejected: 1, 6, 7, 10-13 and 15-22.

The claims on appeal are 1, 6, 7, 10-13 and 15-22.

The rejections at issue are as follows:

Claims 1, 6, 7, 10-13 and 15-22 stand rejected under 35 U.S.C. § 103(a).

4. The Status of Amendments

Appellant filed a Request for Reconsideration under 37 C.F.R. § 1.116 on June 10, 2002 in response to the Final Office Action (Paper No. 17) dated January 15, 2003. The Request for Reconsideration under 37 C.F.R. § 1.116 included remarks on the patentability of the claims, which were not amended. An Advisory Action (Paper No. 19) mailed on March 23, 2003 indicated that the Request for Reconsideration under 37 C.F.R. § 1.116 had been considered but

does not place the application in condition for allowance because the rejection is believed to be proper and should be sustained.

All amendments have been entered. A copy of the pending claims is attached as an Appendix to this brief.

5. Summary of the Invention

Appellant's invention relates generally to a printed wiring board incorporating an electronic component and having a heat radiating element capable of effectively radiating heat generated from the electronic component. Attention is particularly directed to page 7, line 3, to page 15, line 7, of the substitute specification submitted on February 27, 2002 and to Figures 1-6.

In one aspect, as shown in Fig. 1, Appellant's printed wiring board "A" includes an electronic component 1 mounted on a circuit board 2. The electronic component 1 is provided with a heat radiating plate 11 for conducting and radiating heat internally generated. As shown in Fig. 2, the printed wiring board "A" includes a first heat radiating pattern 3a formed on a front surface 2a of the circuit board 2, and connected to the heat radiating plate 11 of the electronic component 1 by soldering. The printed wiring board "A" also includes a second heat radiating pattern 3b formed on a rear surface 2b of the circuit board 2 at a position corresponding to the electronic component 1, and a heat radiating element 4 mounted on the second heat radiating pattern 3b by soldering. The heat radiating plate 11 and the first radiating pattern 3a have the same size whereas the second heat radiating pattern 3b has a larger size than the first radiating pattern 3a or the heat radiating plate 11. In a preferred embodiment, as shown in Figs. 2 and 3, the heat radiating element 4 is made of metal, and is provided, on a rear side thereof, with a

plated layer 42 which is able to be brought into contact with the circuit board 2 and on a front side thereof, with a plurality of fins 40 for radiating heat. In addition, as shown in Fig. 4, a plurality of fins 40' for radiating heat form a corrugated cross-section being uniformly shaped in such a way that a long-length of a belt-shaped hoop material may be extruded and cut to a prescribed length. Also, as shown in Fig. 2, the first heat radiating pattern 3a and the heat radiating plate 11 may be connected to each other via through-holes 5 which pass through the circuit board 2. The first heat radiating pattern 3a may be a common pattern of wiring patterns which constitute circuits formed on the circuit board 2. The second heat radiating pattern 3b may also be a common pattern of wiring patterns which constitute circuits formed on the circuit board 2. As shown in Fig. 4, the fins 40 (40') of the heat radiating element 4 (4') may be designed to stand with respect to the circuit board 2.

In another aspect, referring to Figs. 1 to 4, Appellant's printed wiring board "A" includes the circuit board 2, the electronic component 1 mounted on the circuit board 2, a heat radiating plate 11 for conducting heat internally generated, the first heat radiating pattern 3a for conducting heat formed at a position on a front surface 2a of the circuit board 2 corresponding to the electronic component 1, such that the heat radiating plate 11 of the electronic component 1 is connected to the first heat radiating pattern 3a by soldering, the second heat radiating pattern 3b for conducting heat formed at a position on a rear surface 2b of the circuit board 2 corresponding to the electronic component 1, the plated layer 42 to which the second heat radiating pattern 3b is soldered, and the heat radiating element 4 (4') mounted at a position corresponding to the electronic component 1 on the rear surface 2b of the circuit board 2, such that the heat radiating

element 4(4') is mounted on the circuit board 2 via the plated layer 42. The second heat radiating pattern 3b has a larger area than that of the first heat radiating pattern 3a.

In a preferred embodiment, the plated layer 42 may contain tin or nickel. Moreover, the plated layer 42 may include a first layer containing nickel and a second layer containing tin. In addition, the heat radiating element 4 (4') is made of metal and includes a plurality of fins 40 (40') for radiating heat. The first heat radiating pattern 3a may be a common pattern of wiring patterns which constitute circuits formed on the circuit board 2. The second heat radiating pattern 3b may also be a common pattern of wiring patterns which constitute circuits formed on the circuit board 2. The first heat radiating pattern 3a and the second heat radiating pattern 3b may be connected via at least one through hole 5, and an inner surface 5a of the through hole 5 is covered with a material such as copper foil, which allows the heat from the first heat radiating pattern 3a to be conducted to the second heat radiating pattern 3b instead of the printed wiring board "A".

6. Issues

The first issue presented for review is whether claims 1, 10-12, 15 and 20-22 are patentable under 35 U.S.C. §103(a) over *Christopher et al.* (U.S. Patent No. 6,058,013) in view of *Kamioka* (JP 04-113695) when there is no objective evidence or suggestion to modify *Christopher et al.* in view of *Kamioka* in order to provide for the claimed invention as a whole.

The second issue presented for review is whether dependent claims 6, 7, 13 and 19 are patentable under 35 U.S.C. §103(a) over *Christopher et al.* in view of *Kamioka*, as applied to claims 1 and 15, and further in view of *Miyagi et al.* when there is no objective evidence or

suggestion to modify *Christopher et al.* in view of *Kamioka* and *Miyagi et al.* (U.S. Patent No. 5,506,755) in order to provide for the claimed invention as a whole.

The third issue presented for review is whether dependent claims 16-18 are patentable under 35 U.S.C. §103(a) over *Christopher et al.* in view of *Kamioka* when there is no objective evidence or suggestion to modify *Christopher et al.* in view of *Kamioka* in order to provide for the claimed invention as a whole.

7. Grouping of Claims

In as far as presented herein, claims 1, 6, 7, 10-13 stand or fall together, and claims 15-22 stand or fall together.

8. Arguments

(i) Rejections under 35 U.S.C. § 112, first paragraph

No claims are presently rejected under 35 U.S.C. § 112, first paragraph.

(ii) Rejections under 35 U.S.C. § 112, second paragraph

No claims are presently rejected under 35 U.S.C. § 112, first paragraph.

(iii) Rejections under 35 U.S.C. § 102

No claims are presently rejected under 35 U.S.C. § 102.

(iv) Rejections under 35 U.S.C. §103 of claims 1, 6, 7, 10-13 and 15-22

Claims 1, 10-12, 15 and 20-22 stand finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Christopher et al.* in view of *Kamioka*. Claims 6, 7, 13 and 19 stand finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Christopher et al.* in view of *Kamioka* and further in view of *Miyagi et al.* Claims 16-18 stand finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Christopher et al.* in view of *Kamioka*.

Appellant respectfully asserts that the final rejections under 35 U.S.C. § 103(a) of independent claims 1 and 15, as well as claims 6, 7, 10-13 and 20-22 that ultimately depend from respective independent claims 1 and 15, are improper and should be withdrawn.

The Final Office Action dated January 15, 2003 concedes that *Christopher et al.* fails to teach or suggest the claimed invention as a whole. The Final Office Action specifically identifies that *Christopher et al.* fails to include “said second heat radiating pattern has a larger area than that of said first heat radiating pattern.” as recited in each of independent claims 1 and 15. However, the Final Office Action alleges that the element 12 of *Kamioka* is such a heat radiating pattern, thereby remedying the deficiency of *Christopher et al.* The Final Office Action then concludes that “it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have the second radiating pattern with larger area as disclosed by *Kamioka* in the structure disclosed by *Christopher et al.* to have larger contact area with the heat radiating plate for sufficient heat dissipation.” See, Section 2 of the Final Office Action. Appellant respectfully traverses these conclusions by the Final Office Action.

First of all, while the Final Office action interprets the element 12 of *Kamioka* as a heat radiating pattern, Applicant respectfully submits that the element 12 of *Kamioka* is not a heat radiating pattern. In the previous Request for Reconsideration filed on January 3, 2003, Applicant argued that unlike the present invention, *Kamioka* discloses the element 12 as a silicon insulation sheet which is used for insulating a heating device 8 from a heat sink 3 and providing a good contact status. In response, at page 4 of the Final Office Action, it is asserted that Applicant's arguments filed January 3, 2003 are not persuasive because the functional purpose of the element 12 is allegedly "to transfer heat from the device 8 to the heat sink 3." Applicant respectfully disagrees.

As evidenced by the attached translation of *Kamioka*, description from line 7 to line 18 of page 6 discloses the use of the inner surfaces of the through-holes 6 directly connecting to the frame 3 (which is referred to as "heat sink" by the Office Action) in order to enhance the heat radiation of the device 8. Furthermore, Fig. 3 and description from line 19 of page 6 to line 1 of page 7 of *Kamioka* disclose the element 12 as a rubber-made insulating sheet. However, *Kamioka* never explicitly or implicitly teaches, suggests or describes heat dissipatability characteristics of the rubber-made insulating sheet. In addition, while Fig. 3 of *Kamioka* appears to show that the element 12 has its lower part larger than its upper part, Applicant respectfully submits that such a structural feature of the element 12 is only designed to provide a good insulation effect between the device 8 and the frame 3 and has nothing to do with the heat dissipatability. Therefore, Applicant respectfully asserts that *Kamioka* neither teaches nor suggests a functional purpose of the element 12 for transferring heat from the device 8 to the heat sink 3, as alleged by the Final Office Action. Instead, *Kamioka* describes the element 12 as an

electrical insulator. As a result, one of ordinary skill would not have been motivated as a matter of routine skill to modify *Christopher et al.* in view of *Kamioka* as asserted by the Final Office Action. Accordingly, Applicant respectfully submits that the assertion of the Final Office Action is not supported by the disclosure of *Kamioka*.

In addition, *Miyagi et al.*, which was cited in combination with *Christopher et al.* and *Kamioka* as teaching claims 6, 7, 13 and 19, does not cure the deficiencies of *Christopher et al.* and *Kamioka*.

Thus, with respect to independent claims 1 and 15, Applicant respectfully asserts that the Final Office Action has not established a *prima facie* case of obviousness, and the rejections should be withdrawn. Independent claims 1 and 15, as well as claims 6, 7, 10-13 and 20-22 that ultimately depend from respective independent claims 1 and 15, are patentable over *Christopher et al.* in view of *Kamioka* and in view of *Miyagi et al.*, because these cited references, whether considered singularly or in combination thereof, do not teach or suggest a printed wiring board including at least that “said second heat radiating pattern has a larger area than that of said first heat radiating pattern.” as recited in each of independent claims 1 and 15.

(v) Other Rejections

No claims are presently rejected under grounds other than those referred to above.

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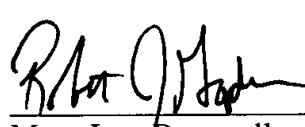
In view of the foregoing, Appellant respectfully requests the reversal of the Final Office Action's rejections and the allowance of the pending claims. Please charge the fee of \$310.00 required under 37 C.F.R. §1.17(c) to our Deposit Account No. 50-0310. If there are any other

fees due in connection with the filing of this Appellant's Brief, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account No. 50-0310.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

By:

for 
Mary Jane Rosewell
Reg. No. 33,652

Robert J. Gaudin
Reg. No. 41,040

Dated: July 14, 2003

CUSTOMER NO. 009629

MORGAN, LEWIS & BOCKIUS LLP

1111 Pennsylvania Avenue, N.W.

Washington, D.C. 20004

Telephone: (202) 739-3000

Facsimile: (202) 739-3001

9. **Appendix**

The text of the claims involved in the appeal are:

1. (Amended) A printed wiring board with an electronic component mounted on a circuit board in which the electronic component is provided with a heat radiating plate for conducting heat internally generated, comprising:

a first heat radiating pattern for conducting heat which is formed on a front surface of said electronic component, and connected to said heat radiating plate of the electronic component by soldering;

a second heat radiating pattern for conducting heat which is formed on a rear surface of said circuit board at a position being opposed to said electronic component, and

heat radiating means mounted on said second heat radiating pattern by soldering at a position being opposed to the electronic component, wherein

said heat radiating plate and said first radiating pattern have a same area whereas said second heat radiating pattern has a larger area than that of said first radiating pattern or said heat radiating plate.

6. (Twice Amended) The printed wiring board according to claim 1, wherein said heat radiating means is made of metal, and is provided, on a rear side thereof, with a plated layer which is able to be brought into contact with said circuit board and on a front side thereof, with a plurality of fins for radiating heat.

7. (Amended) The printed wiring board according to claim 6, wherein said plurality of fins for radiating heat forms a corrugated cross-section being uniformly shaped in such a way that a long-length of a belt-shaped hoop material is extruded and cut at prescribed length.

10. (Amended) The printed wiring board according to claim 1, wherein said first heat radiating pattern and said heat radiating plate are connected to each other via through-holes which pass through said circuit board.

11. (Amended) The printed wiring board according to claim 1, wherein said first heat radiating pattern is a common pattern of wiring patterns which constitute circuits formed on said circuit board.

12. (Amended) The printed wiring board according to claim 1, wherein said second heat radiating pattern is a common pattern of wiring patterns which constitute circuits formed on said circuit board.

13. (Amended) The printed wiring board according to claim 6, wherein said fins of said heat radiating means are designed to stand with respect to the circuit board.

15. (Amended) A printed wiring board, comprising:
a circuit board;
an electronic component mounted on said circuit board and including a heat radiating plate for conducting heat internally generated;

a first heat radiating pattern for conducting heat formed at a position on a front surface of said circuit board corresponding to said electronic component, such that the heat radiating plate of said electronic component is connected to said first heat radiating pattern by soldering;

a second heat radiating pattern for conducting heat formed at a position on a rear surface of said circuit board corresponding to said electronic component;

a plated layer to which said second heat radiating pattern is soldered; and

heat radiating means mounted at a position corresponding to said electronic component on the rear surface of said circuit board, such that said heat radiating means is mounted on said circuit board via said plated layer, wherein

said second heat radiating pattern has a larger area than that of said first heat radiating pattern.

16. The printed wiring board according to claim 15, wherein said plated layer contains tin.

17. The printed wiring board according to claim 15, wherein said plated layer contains nickel.

18. The printed wiring board according to claim 15, wherein said plated layer includes a first layer containing nickel and a second layer containing tin.

19. The printed wiring board according to any one of claims 15 to 17, wherein said heat radiating means is made of metal and includes a plurality of fins for radiating heat.

20. The printed wiring board according to claim 15, wherein said first heat radiating pattern is a common pattern of wiring patterns which constitute circuits formed on said circuit board.

21. The printed wiring board according to claim 15, wherein said second heat radiating pattern is a common pattern of wiring patterns which constitute circuits formed on said circuit board.

22. The printed wiring board according to claim 15, wherein said first heat radiating pattern and said second heat radiating pattern are connected via at least one through hole in heat, and an inner surface of the through hole is covered with a material having a specific heat smaller than that of the printed wiring board.